

54100

11.606V

AUTHORS:

Kargin, V. A., Sogolova, T. I., Metel'skaya, T. K.

TITLE:

Effect of fillers with anisodiametric particles on the properties of polymers. I

PERIODICAL:

Vysokomolekulyarnyye soyedineniya, v. 4, no. 4, 1962, 601-604

TEXT: The effect of the shape of filler particles on the mechanical properties of polymers was studied with polyisobutylene (molecular weight 670 000 and 1 400 000) filled with "Lavsan" fiber (polyethylene tetrathalate; fiber diameter 20 μ , length 25-75 μ to 10 mm). Tensile tests with films pressed at 80°C showed that strength of the samples and their modulus-50 are already increased at low filler concentration (up to 10%), and that the tensile strength of the samples increases with increasing length of the filler fibers. In compression tests with tablets pressed at 140°C the yield temperature was found to decrease at relatively low filler content (up to 15% by weight) and a fiber length not exceeding 100 μ . This may be explained by the effect of the filler on the secondary structures existing in amorphous polymers. In the case of longer fibers (3-10 mm), the yield temperature is increased, i. e., the properties of the high-

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Effect of fillers with anisodiametric...

S/190/62/004/004/017/019
B117/B138

polymer "liquid" of polyisobutylene are affected by size and shape of the particles similar to colloids. When introducing anisodiametric particles, a correlation between the increase of yield temperature and strength was ascertained. During solidification of the polymer its molecular weight is of great importance. Solidification is greater with lower molecular weight of the polymer. The strength of the polyisobutylene samples with different molecular weights and an equal weight of filler is, however, equalized when filler concentration is increased. Materials with properties required for further processing may be produced by altering the length of the filler particles and the filler content. There are 1 figure and 2 tables. The English-language reference is: P. Flory, J. Amer. Chem. Soc., 65, 372, 1943.

ASSOCIATION: Fiziko-khimicheskii institut im. L. Ya. Karpova (Physico-chemical Institute imeni L. Ya. Karpov)

SUBMITTED: April 1, 1961

Card 2/2

37439

S/190/62/004/005/015/026
B110/B108

15.8050
AUTHORS: Shteding, M. N., Kargin, V. A.

TITLE: Thermomechanical study of the inhibitory properties of stabilizers. I. Method. Investigation of the efficiency of stabilizers in the light aging of polyvinyl chloride

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 5, 1962, 720-727

TEXT: The first thermomechanical investigation into the efficiency of inhibitor stabilizers was carried out by V. A. Kargin et al. (Zh. fiz. khimii, 23, 532, 1949; ibid., 23, 563, 1949). In their method, the temperature dependences of deformation are determined at constant load and period of action (Fig. 1). In this way, curves were plotted for the deformation of irradiated PVC. After 1 hr of irradiation, the steadiness of the curves is disturbed as a result of destruction and trend to bond formation. After 2 hrs, cross linkage takes place, marked polydispersity can be observed, and the flow capacity is partly lost between 160 and 180°C. After 24 hrs, cross linkage and cease of flow are complete. Destructive processes predominate in the absence of oxygen: After 1 hr of

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Thermomechanical study of the ...

S/190/62/004/005/015/026
B11Q/B108

irradiation, the mean molecular weight drops sharply, and the range of flow is shifted to lower temperatures by nearly 40°C. After 24 hrs, flow is conserved since the small amount of bonds is compensated by the destruction. The inhibiting properties of stabilizers cause retardation or acceleration of cross linking, thereby changing the course of the strain curves and the range of flow. Amorphous polyvinyl chloride of the type PF-4 (PF-4), which tends to structuralization, was irradiated for 2 hrs while the following stabilizers were added: (1) acceptor stabilizers without inhibiting properties; (2) inhibitor stabilizers; and (3) inhibitors of the diaryl methane series. (1) Melamine and lead silicate: When used as an HCl acceptor, melamine displayed no inhibiting properties. Addition of 10 % of lead silicate to melamine gave less bonds than in the case of pure PVC, and conserved flow since it is a good HCl acceptor and exerts an inhibitory effect. Addition of 10 % of phenyl-β-naphthyl amine retarded cross linkage and deteriorated the flow properties. Good inhibitors produce such effects even when added in very small quantities (e.g., 0.1 % of dye, 118, 2 % of Sudan III). Addition of less than 10 % of phenanthrene and dinaphthyl methane lowered the vitrification temperature and the range of flow. These compounds inhibit cross linkage and conserve

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Thermomechanical study of the ...

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B110/B108

flow even with irradiation for 30 - 40 hrs. There are 7 figures.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physico-chemical Institute imeni L. Ya. Karpov)

SUBMITTED: April 3, 1961

Fig. 1: Schematic diagram of apparatus. Legend: (1) eyepiece of optimeter; (2) optimeter slide; (3) frame; (4) load; (5) loading site; (6) movable bar; (7) and (9) winding of furnace; (8) sample; (10) hole for thermocouple.

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37440

S/190/62/004/005/016/026
B110/B108

5.4600
5.3830

AUTHORS: Pshezhetskiy, V. S., Kargin, V. A., Bakh, N. A.

TITLE: Gamma-induced solid-state polymerization of acetaldehyde

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 5, 1962,
723-733

TEXT: A study was made of gamma-induced solid-state polymerization of acetaldehyde single crystals in order to elucidate the role played by the crystal lattice in the process of polymerization. Additions of acetone and methyl cyclohexane may have the following effects: (1) The "host" molecule is inside the crystallite, and hinders the propagation of the polymerization chain in the lattice; (2) the "host" molecule is outside the crystallite, and hinders the propagation of the polymerization chain between the crystallites. It was found that, as in the case of polymerization of acetaldehyde in a polycrystal, small additions to the single crystal lower the degree of conversion (polycrystal, 25%; single crystal, 40%) and the molecular weight ($[\eta]$ (polycrystal)=3; $[\eta]$ (single crystal)=4). Thus,

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Gamma-induced solid-state ...

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irrespective of the degree of crystallinity, additives form lattice defects where chain rupture occurs. Thermographic investigation showed that temperature jumps occurred below the melting point of crystalline acetaldehyde when slowly heated at a rate of $1.4^{\circ}\text{C}/\text{min}$ and irradiated with $10^{19} \text{ ev}/\text{cm}^3$ at -196°C . As the radiation dose was increased, the jumps shifted to lower temperatures ($-135 - -154^{\circ}\text{C}$). Addition of 0.5 - 18% by weight of acetone lowered both the degree of conversion and the size of the thermographic peak. This proves that the liberation of heat is not due to the recombination of radicals. The mean rate of polymerization and the mean period of addition of one monomer molecule to the growing chain were calculated from the angle of inclination of the peak, and were found to be $0.009 - 0.018 \text{ m}/\text{sec}$ and $8.6 \cdot 10^{-6} - 1.6 \cdot 10^{-6} \text{ sec}$, respectively. The rates of polymerization indicate that acetaldehyde does not obey the laws of thermal explosion. Conclusions: (1) Solid-state polymerization between -134 and -153°C is dependent on the radiation dose; (2) the temperature shift is caused by more polymerization centers at higher doses; (3) at low temperatures, the reaction is very slow since the molecules are immobile;

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Gamma-induced solid-state ...

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(4) in the range of -140 to -150°C the molecular mobility increases and the reaction is accelerated; this is still promoted by the liberation of heat;
(5) at higher radiation doses, an avalanche-like extension of the reaction occurs even at lower temperatures. The molecular weight is presumably lowered by an increase in the rate of chain rupture owing to the formation of active centers. There are 5 figures and 2 tables.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova
(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: April 5, 1961

Card 3/3

15-2001
11.2210

37141

S/190/62/004/005/018/026
B110/B108

AUTHORS: Kargin, V. A., Sogolova, T. I., Pavlichenko, N. P.
TITLE: Relaxation effects in crystalline polyolefins
PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 5, 1962,
738-742

TEXT: The behavior of polyethylene and polypropylene under periodic force action was investigated over a wide range of temperatures. The tests were made in an apparatus devised by Aleksandrov and Gayev (Yu. S. Lazurkin, Zh. tekhn. fiziki, 9, 1261, 1939). A force was applied at frequencies of 1, 10, 100, and 1000 cycles per minute, temperature was varied from -80 to 140°C. Under such conditions, polypropylene was found to possess a broad relaxation spectrum throughout the range from T_v (vitrification temperature) to T_f (flow temperature). An attempt was made to ascertain in how far the results obtained depended on the polymer structure. For this purpose, the authors investigated: (1) polypropylene (200°C, 166 kg/cm²); (2) hard

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Relaxation effects in crystalline ...

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polypropylene (200°C , 166 kg/cm^2); (3) amorphous polypropylene; (4) isotactic polypropylene (200°C , 166 kg/cm^2); (5) ethylene-propylene copolymer (120 and 200°C , 166 kg/cm^2); (6) low-density polyethylene (170°C , 166 kg/cm^2); and (7) high-density polyethylene (140°C , 166 kg/cm^2). The maximum specific pressure of samples 1, 2, 4, 6, and 7 was 9.6 kg/cm^2 , and that of samples 3, and 5 was 4.8 kg/cm^2 . Deformation increased substantially from 0°C onward, reached a maximum at $+30^{\circ}\text{C}$, and finally decreased again as a result of crystallization. The whole sequence of relaxation processes was found to occur on amorphous polypropylene. Owing to the low molecular weight, the flow temperature T_f was shifted to lower temperatures. Both high-density and low-density polyethylene possessed a broad relaxation spectrum between T_v and T_f . Samples of more irregular shape were obtained by increasing the propylene content in ethylene-propylene copolymers. Crystalline polymers behave like elastic systems capable of withstanding strong deformations. For this reason, it is necessary that relaxation processes be taken into

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Relaxation effects in crystalline ...

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account when using articles made of crystalline polymers. There are 2 figures and 1 table.

ASSOCIATION: Institut neftkhimicheskogo sinteza AN SSSR (Institute of Petrochemical Synthesis AS USSR); Fiziko-khimicheskii institut im. L. Ya. Karpova (Physicochemical Institute imeni. L. Ya. Karpov)

SUBMITTED: April 12, 1961

Card 3/3

YERMOLINA, A.V.; IGONIN, L.A.; KARGIN, V.A.

Relation between physicomachanical properties and the
nature of secondary structures in crystallizing polymers.
Part 2: Photomicrographic investigation of the spherulite
structure of polyamide 68 in bulk. Vysokom.soed. 4
no.9:1380-1384 S '62. (MIRA 15:11)

1. Nauchno-issledovatel'skiy institut plasticheskikh
mass.

(Polyamides)
(Crystallization)

NOVIKOV, A.S.; GALIL-OGLY, F.A.; SLOVOKHOTOVA, N.A.; DYAMAYEVA, T.N.;
KARGIN, V.A.

Vulcanization of fluorine-containing copolymers with polyamines
with the use of infrared spectroscopy. Vysokom. soed. 4
no.12:1799-1805 D '62.
(MIRA 15:12)

1. Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti.
(Polymers) (Fluorine compounds) (Vulcanization)

KARGIN, V.A.; KOZLOV, P.V.; MIRLINA, S.Ya.; KAPRALOVA, Z.A.;
CHEBOTKEVICH, P.F.

Mass transfer and structure-forming processes in the
polymer-homologous series of polyacrylic acid and fractionated
gelatin. Vysokom. sced. 4 no.12:1881-1886 D '62. (MIRA 15:12)

1. Moskovskiy gosudarstvennyy universitet imeni
M.V. Lomonosova.

(Gelatin)

(Acrylic acid)

(Mass transfer)

KARGIN, V. [Karhin, V.], akademik

Chemists supplement nature. Nauka i zhyttia 12 no.10:38-39 0
'62. (MIRA 16:1)
(Polymers)

BERESTNEV, V.A.; GATOVSKAYA, T.V.; KARGIN, V.A.

Structural changes in cord fibers of tires in service. Kauch.i
rez. 21 no.1:34-36 Ja '62. (MIRA 15/1)

1. Nauchno-issledovatel'skiy institut shinnoy promyshlennosti i
Nauchno-issledovatel'skiy fiziko-khimicheskiy institut im. L.Ya.
Karpova.

(Tire fabrics)

BERESTNEV, V.A.; GATOVSKAYA, T.V.; KARGIN, V.A.

~~SECRET~~
Manometer for measuring pressure with an increased accuracy.
Zav. lab. 28 no.9:1137 '62. (MIRA 16:6)

1. Nauchno-issledovatel'skiy fiziko-khimicheskiy institut im.
L.Ya. Karpova.

(Manometer)

KARGIN, V., akademik

Chemistry builds a bridge to the future. Av. i kosm. 45 no.9:
84-85 '62. (MIRA 15:10)

(Chemistry, Technical)

S/020/62/142/003/021/027
B101/B110

AUTHORS: Kargin, V. A., Academician, Sogolova, T. I., and Talipov, G. Sh.

TITLE: Structure formation in crystalline polystyrene

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 142, no. 3, 1962, 627-628

TEXT: The authors studied the formation of supermolecular structures in crystalline, isotactic polystyrene. The sample was fused onto an object glass, brought to test temperature (120, 145, 175°C) in a thermostat, and the structure formation was investigated and photographed in polarized light with 200 - 600fold magnification by means of an МИМ-8 (MIN-8) microscope. The structure formation was found to be a complicated process, not ceasing with the formation of spherulites. Spherulites both grow and aggregate. At high temperature and prolonged crystallization, the number of growth centers is small, and regular spherulites are formed without disturbances. At low temperature, the growing rate is low but the number of centers is large. In this case, aggregation to bands takes place (length 25 - 500μ, width 1 - 120μ). Spherulites united to bands grow only
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Structure formation in crystalline...

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B101/B110

in width (possibly also in thickness) until laminae are formed and the growth ceases. The bands in one lamina are ordered, but their position in superimposed laminae does not coincide. The time of crystallization has the same effect on the formation of supermolecular structure as temperature has. Thus, systems of a desired structure can be produced. No molecules or molecule packages but spherulites of the order of magnitude of colloidal particles act as structural units in polymer systems. A similarity with the formation of gels and jellies is assumed. There are 4 references: 3 Soviet and 1 non-Soviet. The reference to the English-language publication reads as follows: F. Dannusso, G. Moraglio, J. Polymer Sci., 24, 161 (1957). ✓

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physico-chemical Institute imeni L. Ya. Karpov)

SUBMITTED: October 11, 1961

Card 2/2

34,78
S/020/62/142/004/015/022
B101/B110

15.8100

AUTHORS: Kargin, V.A., Academician, Sogoleva, T I., and Talipov, I Sh.

TITLE: Structure formation in plasticized crystalline polystyrene

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 142, no. 4, 1962, 844

TEXT: Investigations of the supermolecular structure of nonplasticized polystyrene (DAN, 142, no. 3 (1962)) showed that secondary structures bands or lamellas, composed of spherulites, developed between 110 and 215°C. The effect of plasticizers on structure formation and mechanical properties of polystyrene (PSt) was now investigated by the same method at 120, 145 and 175°C. The following data were found for the spherulite dimensions (in microns):

Duration of crystallization, min	Initial PSt	Concentration of plasticizer, % by volume						
		A		B		C		
		8	20	15	25	12	18	31
10	4	13	11	10	15	15	.	10
30	8	60	55	35	35	50	50	38
60	17	110	92	70	67	70	.	68
150	40	300	230	260	190	220	.	170

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Structure formation in...

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B101/B110

A = cetyl chloride; B = dimethyl phthalate; C = dibutyl sebacate. Thus an increase in size of the spherulites occurred for all plasticizers, the formation of bands or lamellas, especially above 120°C, being suppressed. The effect of plasticizers was less marked at higher temperatures (175 - 215°C) since under such conditions the spherulites are quickly growing even in nonplasticized PSt. The strength of plasticized PSt increased with increasing plasticizer content (Fig. 4). X-ray pictures of initial and plasticized PSt showed only slight differences. Accordingly the effect of plasticizer does not consist in a change of the primary crystalline structure (of the spherulite) of the polymer but in a suppression of secondary-structure formation. This also causes a reduction in strength which was investigated at a temperature 25°C higher than the vitrification temperature. There are 4 figures, 1 table, and 2 Soviet references.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physics-chemical Institute imeni L. Ya. Karpov)

SUBMITTED: October 26, 1961

Card 2/3

S/020/62/142/005/017/022
B110/B101

AUTHORS: Kargin, V. A., Academician, Kozlov, P. V., Boukhal, K., and
Bakeyev, N. F.

TITLE: Recrystallization of polycaproamide under the influence of
mechanical actions

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 142, no. 5, 1962, 1084 - 1085

TEXT: The effect of mechanical action on the structure of polycaproamide obtained by bulk polymerization at 195°C of caprolactam in the presence of Na metal and acetyl caprolactam was studied. To remove the monomer, a 7 cm long block (1.5 cm in diameter) was put into water of 60°C for 2 weeks, then dried at 10 mm Hg for 3 months. The molecular weight was 14,000. The blocks were cooled in liquid nitrogen, broken up, and investigated with a metallographic МИМ-8 (MIM-8) microscope. Coarse spherulites of ~0.1 mm diameter are formed in the polycaproamide block at < 190 - 195°C (melting point) during polymerization. The blocks were (a) cold rolled, and (b) hammered. For (a), 3 x 1.5 x 0.5 cm platelets were rolled for 30 min, then subjected to brittle fracture in liquid N₂, and investigated
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Recrystallization of polycaproamide ...

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For (b), 0.5 cm high disks of 1.5 cm diameter were used. After cold rolling and 100-fold impact deformation, the spherulite structures disappeared, and rhombic pyramid structures were formed which reminded of the single crystals formed during polyamide crystallization from dilute solutions. This recrystallization is similar to the behavior of metals in cold rolling but takes place without heating of the sample owing to the low vitrification temperature of polycaproamide. This proves that the recrystallization is not associated with the diffusion mechanism of the reconstruction of structure-forming macromolecules. There are 4 figures and 4 references: 3 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: P. H. Geil, J. Polymer Sci., 44, 449 (1960).

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova
(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: November 1, 1961

Card 2/2

13.8412

5/020/62/142/006/014/013
B106/B101

AUTHORS: Kargin, V. A., Academician, Plate, N. A., and Tung Tsuch-chu

TITLE: Mechanicochemical polymerization of methacrylamide in the solid state

SYNOPSIS: Akademiya nauk SSSR. Doklady, v. 142, no. 6, 1962, 1512 - 1515

TEXT: The mechanicochemical polymerization of solid methacrylamide (MMA) is described. Pure table salt, barium sulfate, or quartz sand were used as polymerization catalysts. The weighed sample of recrystallized MMA (m. 104°C) and the catalyst concerned (5 g in total) was introduced into a steel drum filled with steel balls, and the drum set in vibration in an eccentric vibration mill of laboratory scale according to a method described earlier (N. A. Plate, V. V. Prokopenko, V. A. Kargin, Vysokomolekul. soved., 1, 1713 (1959)). The reaction products were separated by fractional precipitation from aqueous solutions with methanol and by selective extraction with benzene. Study of the polymerization in the presence of 0.5% NaCl at room temperature showed that after a brief induction period the polymerization rate increased with increasing dispersion time. ✓

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Mechanicochemical polymerization...

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B106/B101

This increase decreased gradually, and the polymethacrylamide (PMAA) yield finally reached a constant value. Changes in the monomer-to-catalyst ratio were found to affect greatly the degree of polymerization (Fig. 2). With the use of crystalline quartz a similar process was observed, but the maximum PMAA yield was even more distinct (48% conversion) and lay at a content of 5% SiO_2 . The decrease in the high-polymer PMAA yield in the case of high catalyst contents is due to an increase in the amount of oligomers (dimers and trimers). Viscosity measurements and cryoscopic determinations of molecular weights showed that polymerization of MMA in the presence of NaCl yielded in all monomer-to-catalyst ratios a polymer with the intrinsic viscosity $[\eta] = 0.15$ (measured in aqueous solutions at 18°C), as well as MMA dimers and trimers. Polymerization and oligomerization are assumed to be parallel and independent. Special experiments showed that for a mechanicochemical initiation of polymerization the MMA monomer had to be solid. Addition of an electron to a monomer molecule and, thus, formation of an ion radical is suggested as the mechanism of initiation of polymerization in the systems NaCl-MMA and BaSO_4 -MMA. The electron sources are defects of the F-center type originating in the lattice of

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Mechanicochemical polymerization...

S/020/62/142/006/014/010
B106/B101

ionic salts under the action of mechanical forces and ionized to the accompaniment of emission of electrons. In the case of SiO_2 , mechanical grinding causes formation of radical centers as a result of the rupture of covalent Si-O-Si bonds. Since the transfer of active centers from the solid phase of the catalyst to the solid phase of the monomer is one act of the formation of macromolecules in the systems mentioned, the affinity of these two solid phases and their mutual wettability are of great importance. Polymerization of MAA in the presence of salts is also satisfactory at low temperatures (down to -150°C). With continuous mechanical grinding of the monomer crystals, the mobility of the molecules on the surface of the solid particles is assumed to come very close to the mobility at the instant of phase transformations. The high conversion degree of the monomer (10 and 48%, respectively, within 45 min) definitely indicates a quick polymerization process. In agreement with this assumption, the polymerization rate in the temperature range of the solid state at constant initiation rate depends only slightly on temperature. This slight temperature dependence leads to a very low activation energy (of the order of 0.1 kcal/mole) for MAA polymerization. The most defective crystal lattice of the monomer, not the ideal crystal, Card 3/5

Mechanicochemical polymerization...

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B106/B101

shows optimum reactivity during polymerization. Chain breaking also occurs from defects, not through recombination of radicals, since the molecular weight of PMMA proved to be practically independent of temperature ($[\eta]_{+20^{\circ}\text{C}} = 0.15$; $[\eta]_{-150^{\circ}\text{C}} = 0.17$). Suppression of polymerization by hydroquinone indicates the radical nature of the process. There are 3 figures, 1 table, and 8 references: 7 Soviet and 1 non-Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova
(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: November 18, 1961

Fig. 2. Polymethacrylamide yield as a function of catalyst concentration.
Legend: Ordinate: polymer yield; abscissa: salt content; (u) NaCl - MAA;
(s) BaSO_4 - MAA; (k) NaCl - MAA - heptane.

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S/020/62/143/003/016/029
B110/B138

AUTHORS: Gatovskaya, T. V., Pavlyuchenko, G. M., Berestnev, V. A., and
Kargin, V. A., Academician

TITLE: Assessing the flexibility of polyethylene chains from the sorp-
tion values

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 143, no. 3, 1962, 590 - 591

TEXT: The chains in crystalline polymers must be flexible for good ordering and crystal lattice formation. The sorption values at room temperature can be used to find the flexibility of amorphous molecules, but they must be determined during melting, when no crystalline ranges are present. Another method must therefore be found. The sorption properties of polyethylene were ascertained within a wide temperature range and below the melting temperature of its crystals. The melting point of a regular polyethylene specimen with molecular weight of about one million was determined on a polarization microscope. The spherulites disappear at 131-136°C and drops appear at 164°C. The sorption isotherms were obtained by using spring weights in an air thermostat. Sorption gradually increases between:

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Assessing the flexibility ...

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75 and 130°C. The sorption isotherms for 140, 150 and 200°C coincide with the 130°C one. This means that sorption reached maximum at the melting point of the spherulites. The merging of the 125°C sorption isotherm with the 130°C one at about 60% relative vapor pressure, is probably due to the plastifying effect of n-dodecane, causing the polymer to melt at low temperature. The size of the thermodynamic segment was calculated to find flexibility. The graph showing the size of the thermodynamic segment as a function of relative vapor pressure of n-dodecane at various temperatures shows that the presence of a low-molecular compound does affect it. It was therefore necessary to extrapolate to the zero content of the adsorbate. At 75°C the segment consists of about 600 carbon atoms. A temperature rise increases the flexibility of the chains, and the possibility of realizing a large number of conformations. On melting, chain flexibility rises steeply and all conformations are realized. In this case the minimum segment value of 60 carbon atoms is only five times higher than the length of the adsorbate molecules. This appears to be the optimum flexibility for crystal formation. Rubbers and rubberlike polymers with highly flexible chains with 20-40 carbon atoms in the segment show poor crystallizability owing to the great difference between the entropies of the crystalline and amorphous state. There are 3 figures.

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Assessing the flexibility ...

S/020/62/143/003/016/029
B110/B138

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physico-
Chemical Institute imeni L. Ya. Karpov)

SUBMITTED: December 19, 1961

Card 3/3

S/O/O/62/144/005/012/017
B124/B130

AUTHORS: Kargin, V. A., Academician, Zhuravleva, V. G., and
Berestneva, Z. Ya.

TITLE: Electron microscopic study of rubber structures

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 144, no. 5, 1962, 1093-1090

TEXT: Contrary to current views of elastomers as systems consisting of entangled molecular chains, electron-microscopic analysis of thin natural and synthetic rubber (GK-30 (SKB-30)) films showed that they consist of a disordered arrangement of bands which are shown to be the structural elements of the film. The nature of the pattern remains the same with a different support. When the film is stretched, fine fibers appear which are the elementary structural units of rubber, i.e., bundles of chains. At -50°C, structures are produced with a higher degree of order. There are thus ordered regions in rubbers just as in other amorphous polymers. There is 1 figure. The English-language references are: V. A. Kargin, J. Pol. Sci., 30, 247 (1958); C. E. Hall, E. A. Hauser et al., Ind. and Eng. Chem., 36, 7, 634 (1944); E. A. Hauser, Rubber Age, 78, 6, 881 (1956);

Card 1/2

Electron microscope study...

S:020/62/144/005/012/017
B124/B138

E. A. Hauser, Rubber Age, 78, 5, 713 (1956).

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physico-chemical Institute imeni L. Ya. Karpov)

SUBMITTED: March 1, 1962

Card 2/2

KARGIN, V.A. akademik; EFENDIYEV, A.A.; CHERNEVA, Ye.P.; TUNITSKIY, N.N.

Preparation and study of a homogenous polymeric membrane having
complex-forming properties. Dokl. AN SSSR. 144 no.6:1307-1308
Je '62. (MIRA 15:6)

1. Fiziko-khimicheskiy institut im. L.Ya.Karpova.
(Membranes (Chemistry)) (Polymers)

S/O20/62/145/004/015/024
B110/B144

AUTHORS: Bort, D. N., Minsker, K. S., Okladnov, N. A., Shtarkman, B. R.,
and Kargin, V. A., Academician

TITLE: Direct formation of secondary polyethylene structures in
polymerization processes

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 145, no. 4, 1962, 787 - 788

TEXT: Crystalline polymer structures ranging from primary supermolecular forms (packets) to higher secondary structures were studied directly in the course of the polymerization. Polyethylene synthesized in benzene (60°C, 10 atm) with a catalytic mixture of partially chlorinated metallic Al and TiCl_3 forms a layer ~ 4-5 mm thick on the Al surface. This layer consists of fibers perpendicular to the Al surface with cross stripes 1.5 μ wide. After dispersion of the fibers in water and separation of the larger particles, helical bands with distinct transverse folds (3.5 - 4.5 μ) of striated structure (150 - 250 Å packets) were observed by electron microscope. This proves the stepwise development of the supermolecular structure, corresponding to the structure of the crystalline polymer phase

Card 1/2

Direct formation of secondary ...

S/020/62/145/004/015/024
B110/B144

according to V. A. Kargin, G. L. Slonimskiy (Kratkiye ocherki po fiziko-khimii polimerov (The physical chemistry of polymers in brief outline), M. 1960). The distribution of molecular weight indicates that polyethylene consists of homologs having an average molecular weight of 100,000. The melting point (121 - 132°C), the heat of fusion (35.9 cal/g), and the degree of crystallization (67 %) were determined thermographically. The density was 0.955 g/cm³. The assumption of V. A. Kargin, G. L. Slonimskiy (Usp. khim., 24, 785 (1955)) that internal stresses affect the shape of the crystals is confirmed. There are 3 figures. ✓

SUBMITTED: April 6, 1962

Card 2/2

ABRAMOVA, I.M.; YERMOLINA, A.V.; IGONIN, L.A.; KARGIN, V.A., akademik

Morphology of the supermolecular structure of polyformaldehyde.
Dokl.AN SSSR 145 no.5:1047-1048 '62. (MIRA 15:8)

1. Gosudarstvennyy nauchno-issledovatel'skiy institut plasticheskikh
mass. (Formaldehyde) (Photomicrography)

ZHURAVLEVA, V.G.; BERESTNEVA, Z.Ya.; KARGIN, V.A., akademik

Electron microscope study of the structure of isotactic
polybutylene. Dokl. AN SSSR 146 no.2:366-367 S '62.
(MIRA 15:9)

1. Fiziko-khimicheskiy institut im. L.Ya. Karpova.
(Butene) (Polymers)

S/020/62/146/006/011/016
B106/B186

AUTHORS: Kargin, V. A., Academician, Andrianova, G. P.

TITLE: Supermolecular structures in isotactic polypropylene foils

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 146, no. 6, 1962, 1337-1339 ✓

TEXT: Microscopic analysis of the structuralization of isotactic polypropylene foils as dependent on the temperature of the melt and on the cooling rate of the foils revealed spherulitic structures which may greatly vary in shape and size (the latter from 20 to 400 μ), depending on the conditions of crystallization. The two principal forms of spherulites differed only in their structural defects. Two-dimensional spherulites with a distinctly marked fibrillar structure (first type) are formed by heating polypropylene to 195°C between microscope slides and by slowly cooling them down to room temperature within 5-6 hrs. The second type are big, compact spherulites with fewer defects than the first type. These are obtained by pressing foils (melt temperature, 230-280°C) which are then cooled down to 80°C, or by keeping finished polypropylene foils at 180°C for 5-10 min and subsequently at 80°C for 5-6 hrs. In addition, there was a great variety of
Card 1/3

Supermolecular structures ...

S/020/62/146/006/011/016
B106/B186

crystalline structures. Spherulites begin to intergrow as soon as crystal centers of colloidal dimensions occur. These centers are oriented along parallel straight lines with different spacing. The widths of the spherulites depends on the number of parallel straight lines. Supermolecular intergrowth occurs when the temperature of the melt is too low to melt the large number of crystallization nuclei. Thus, the 'fluctuation clusters' in the melt become centers of structuralization. The structures are strongly affected by changes in the temperature of the melt and in the cooling rate of the foils. No large spherulites and intergrowths are obtained by allowing melts to cool from 180-200°C down to room temperature within 20-30 min. Foils kept at 135 - 140°C for 1-6 hrs display fibrillar structures, since the molecular mobility of polypropylene at these temperatures is so high that previously prevented crystallization becomes possible. In the next paper peculiarities of the mechanical behavior of the various morphological forms of isotactic polypropylene revealed here will be reported. There are 4 figures. The English-language references are: F. J. Padden, H. D. Keith, J. Appl. Phys., 30, no. 10, 1479 (1959); Masakazu Inoue, J. Polym. Sci., 55, no. 162, 443 (1961).

Card 2/3

Supermolecular structures ...

S/020/62/146/006/011/016
B106/B186

ASSOCIATION: Institut neftekhimicheskogo sinteza Akademii nauk SSSR
(Institute of Petrochemical Synthesis of the Academy of
Sciences USSR)

SUBMITTED: June 18, 1962

✓

Card 3/3

S/020/62/147/001/020/022
B101/B144

AUTHORS: Pavlyuchenko, G. M., Gatovskaya, T. V., Kargin, V. A.,
Academician

TITLE: Estimate of the chain flexibility of polybutylene on the
basis of sorption data

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 147, no. 1, 1962, 150 - 152

TEXT: The isotherms for the sorption of n-octane by polybutylene with the intrinsic viscosity 1.14 at 90°C in Dekalin, m.p. 94.3 - 104.8°C, were determined with a spring balance at 50 - 115°C. The isotherms for 94, 104 and 115°C coincided within the limits of experimental error. Up to a relative pressure p/p_s of the adsorbate, the 50°C isotherm was higher than the 60°C isotherm, which is explained by looser packing of the chains at 50°C. The 85°C isotherm intersects the 94°C isotherm at $p/p_s \sim 0.7$ and if the 75°C isotherm is extrapolated this too intersects the 94°C isotherm. Hence, capillary condensation is assumed near the melting point, caused by the formation of higher ordered structures and of spaces between them. An estimate of the capillary diameter according to Kelvin gives 100 - 1000 Å

Card 1/2

Estimate of the chain flexibility...

S/020/62/147/001/020/022
B101/B144

which is in agreement with the order of magnitude of the structure formations and pores found earlier (DAN, 146, no. 2(1962)) by electron microscopy. A calculation of the thermodynamic segment characterizing the chain flexibility gives a length of 60 carbon atoms. Since, however, polybutylene contains lateral ethyl groups, the segment of the main chain is assumed to have a length of only 30 carbon atoms which is consistent with the length of typical rubber segments. There is 1 figure.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physico-chemical Institute imeni L. Ya. Karpov)

SUBMITTED: June 29, 1962

Card 2/2

S/020/62/147/002/018/021
B101/B196

AUTHORS: Kargin, V. A., Academician, Sogolova, T. I., Pavlichenko, N.P.

TITLE: Peculiarities of stress relaxation in isotactic crystalline polypropylene

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 147, no. 2, 1962, 407-409

TEXT: Films of crystalline polypropylene were stretched by 8% at 140°C, and the stress-versus-time curve was plotted. Within the first five minutes the stress fell rapidly from ~120 to ~30 kg/cm², followed by a second drop in stress after 2.5-3.5 hrs. An investigation of the deformed surfaces and cross sections of the samples showed cracking perpendicular to the direction of stress and formation of larger spherulites than in the case of unstretched film. No cracking occurred with amorphous polypropylene. Conclusions: The first drop in stress is due to fast relaxation processes such as generally occur in polymers. Thereupon supermolecular structures and cracks are formed which reduce the actual cross section and cause the second drop in stress. In the formation of irreversible deformations, structural elements

Card 1/2

Peculiarities of stress relaxation...

S/020/62/147/002/018/021
B101/B186

are displaced under the action of forces exceeding the strength of the material. There are 4 figures.

ASSOCIATION: Institut neftekhimicheskogo sinteza Akademii nauk SSSR
(Institute of Petrochemical Synthesis of the Academy of
Sciences USSR); Fiziko-khimicheskiy institut im. L. Ya. Karpova
(Physicochemical Institute imeni L. Ya. Karpov)

SUBMITTED: July 20, 1962

Card 2/2

BERESTNEV, V.A.; LYTKINA, M.B.; GATOVSKAYA, T.V.; KARGIN, V.A.

Studying the characteristics of the molecular structure of the
various types of viscose fibers. Khim. volok. no.1:71-74 '62.
(MIRA 18:4)

1. NIISHP (for Berestnev, Lytkina). 2. Fiziko-khimicheskiy institut
im. Karpova (for Gatovskaya, Kargin).

KOZLOV, P.V., otv. red.; ANDRIANOV, K.A., red.; DOGADKIN, B.A., red.;
DOLGOPLOSK, V.A., red.; YENIKOLOPYAN, N.S., red.; KARGIN,
V.A., red.; KOLESNIKOV, G.S., red.; KOROTKOV, A.A., red.;
KORSHAK, V.V., red.; LAZURKIN, Yu.S., red.; MEDVEDEV, S.S.,
red.; MIKHAYLOV, N.V., red.; PASYNSKIY, A.G., red.;
SLONIMSKIY, G.L., red.; SMIRNOV, V.S., red.; TSVETKOV, V.N.,
red.; FREYMAN-KRUPENSKIY, D.A., tekhn. red.

[Adhesion of polymers] Adgeziia polimerov; sbornik statei.
Moskva, Izd-vo AN SSSR, 1963. 142 p. (MIRA 16:10)
(Polymers) (Adhesion)

KOLESNIKOV, G.S., *otv. red.*; ANDRIANOV, K.A., *red.*; DOGADKIN, B.A., *red.*; DOLGOPLOSK, B.A., *red.*; YENIKOLOPYAN, N.S., *red.*; KARGIN, V.A., *red.*; KOZLOV, P.V., *red.*; KOROTKOV, A.A., *red.*; KORSHAK, V.V., *red.*; LAZURKIN, Yu.S., *red.*; MEDVEDEV, S.S., *red.*; MIKHAYLOV, N.V., *red.*; PASYNSKIY, A.G., *red.*; SLONIMSKIY, G.L., *red.*; SMIRNOV, V.S., *red.*; TSVETKOV, V.N., *red.*; FREYMAN-KRUPENSKIY, K.A., *tekh. red.*

[Carbochain high-molecular weight compounds] Karbotsepye vysokomolekuliarnye soedineniia; sbornik statei. Moskva, Izd-vo AN SSSR, 1963. 287 p. (MIRA 17:1)

KARGIN, V.A.

"Properties of block and graft copolymers in the solid state."

Report submitted to the Intl. Symp. of Macromolecular Chemistry,
Paris, France 1-6 July 1963

KABANOV, V.A., ZUEOV, V.P., KOVALEVA, V.P., KARGIN, V.A.

Polymerization of nitriles and pyridine.

Report submitted for the International Symposium of Macromolecular chemistry,
Paris, 1-6 July 63

KARGIN, V.A., KABANOV, V.YA., PAPISOV, I.M.

Effect of phase transitions on the polymerization of monomers below their melting point.

Report submitted for the International Symposium of Macromolecular chemistry, Paris, 1-6 July 63

ACCESSION NR: AT4020702

S/0000/63/000/000/0107/0113

AUTHOR: Kargin, V. A.; Sogolova, T. I.; Pavlichenko, N. P.

TITLE: Stress relaxation in isotactic polypropylene

SOURCE: Karbotsepnyye vyvokomolekulyarnyye soyedineniya (Carbon-chain macromolecular compounds); sbornik statey. Moscow, Izd-vo AN SSSR, 1963, 107-113

TOPIC TAGS: stress relaxation, polypropylene, isotactic polypropylene, crystalline polypropylene, crystal stress, irreversible deformation, microphotography

ABSTRACT: In order to determine the presence of irreversible deformations in crystalline organic polymers, 0.7 mm films of isotactic crystalline polypropylene, prepared with $TiCl_3 + Al(C_2H_5)_3$ as a catalyst, were pressed under a load of 70 kg/cm² at 200C and were then tested for stress relaxation at different temperatures and deformations not exceeding 15%. At 120-160C, polypropylene was found to undergo marked structural changes, as shown by microphotography. The development of an irreversible deformation in polypropylene is due not only to the displacement of the macromolecules or chain bundles, but also to the displacement of larger structural elements. These displacements are accompanied by the appearance of cracks and the failure of the whole sample. Orig. art. has: 6 figures.

Card 1/2

ACCESSION NR: AT4020702

ASSOCIATION: Institut neftekhimicheskogo sinteza AN SSSR (Institute of Petro-chemical Synthesis, AN SSSR); Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physico-Chemical Institute)

SUBMITTED: 28Apr62

DATE ACQ: 20Mar64

ENCL: 00

SUB CODE: OC, MT

NO REF SOV: 010

OTHER: 003

Card 2/2

ACCESSION NR: AT4033996

S/0000/63/000/000/0129/0133

AUTHOR: Pshezhetskiy, V. S.; Kargin, V. A.

TITLE: Gamma- or X-ray polymerization of solid propionaldehyde

SOURCE: Geterotsepnnyye vy*sokomolekulyarnyye soyedineniya (Heterochain macro-molecular compounds); sbornik statey. Moscow, Izd-vo "Nauka," 1963, 129-133

TOPIC TAGS: polymer, radiation polymerization, solid phase polymerization, propionaldehyde, propionaldehyde polymerization, polypropionaldehyde, hydrocarbon radical, hydrocarbon radical effect, binary bond orientation

ABSTRACT: Specimens of solid amorphous propionaldehyde, polycrystalline material and macrocrystalline monomer (derivation procedures given) were polymerized in a cryostat (-100 to -196C, 10^{-4} mm vacuum, X-ray or gamma radiation $1.5 \cdot 10^{17}$ to $8.4 \cdot 10^{18}$ ev/g.min). The polypropionaldehyde obtained was a rubbery substance with molecular weight $3-5 \cdot 10^5$. It was found that radiation polymerization in the solid phase occurs only with a crystalline monomer, a phenomenon related to the definite orientation of binary bonds which promotes formation of a polymer chain. Polymerization is impeded, sometimes terminated, by any interference with this orientation, and takes place near the m.p. (-103.5C). The need for some freedom of rotational-oscillatory movement in the propionaldehyde

Card 1/2

ACCESSION NR: AT4033996

molecules is governed by differences in distances between atoms in the monomer's crystalline lattice and in the polymer chain. Comparison of polymerization mechanisms for propionaldehyde, acetaldehyde and formaldehyde indicates a significant effect of the magnitude of a molecule's hydrocarbon radical on temperature and rate of the reaction, as well as on molecular weight and yield of the polymer. "The authors express gratitude to N. A. Bakh for evaluating the results of this study".
Orig. art. has: 4 tables, 2 graphs.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova
(Moscow State University)

SUBMITTED: 16Aug62

DATE ACQ: 30Apr64

ENCL: 00

SUB CODE: 0C

NO REF SOV: 003

OTHER: 000

Card 2/2

ACCESSION NR: AT4034000

S/0000/63/000/000/0147/0153

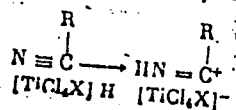
AUTHOR: Zubov, V. P.; Terekhina, I. P.; Kabanov, V. A.; Kargin, V. A.

TITLE: Polymerization of benzonitrile

SOURCE: Geterotsepnnyye vyysokomolekulyarnyye soyedineniya (Heterochain macromolecular compounds); sbornik statey. Moscow, Izd-vo "Nauka," 1963, 147-153

TOPIC TAGS: polymer, benzonitrile, titanium tetrachloride, boron fluoride, zinc chloride, polymerization kinetics, polymerization mechanism, benzonitrile polymer, benzonitrile trimer, polymer spectral analysis

ABSTRACT: Specially purified benzonitrile (b.p. 191.3C/760 mm, $n_D^{22.5} = 1.5310$) was polymerized in a series of reactions, mostly with titanium tetrachloride (134C/735 mm) as well as with zinc chloride or boron fluoride, to determine the mechanism and kinetics of the polymerization process. The structure of the polymerization products is analyzed in terms of the results of an infrared spectral analysis (see Fig. 1 in the Enclosure). Polymerization in the presence of $HP0_3$ is illustrated by

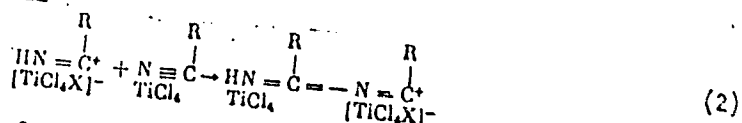


(1)

- Card 1/3

ACCESSION NR: AT4034060

for initiation and



for chain growth. $\text{R} = \text{C}_6\text{H}_5$. The formation of a trimer, its accumulation and participation in the polymerization process are discussed. Orig. art. has: 3 graphs, 1 illustration and 6 chemical formulas.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet Im. M. V. Lomonosova
(Moscow State University)

SUBMITTED: 010ct62

DATE ACQ: 30Apr64

ENCL: 01

SUB CODE: OC

NO REF SOV: 005

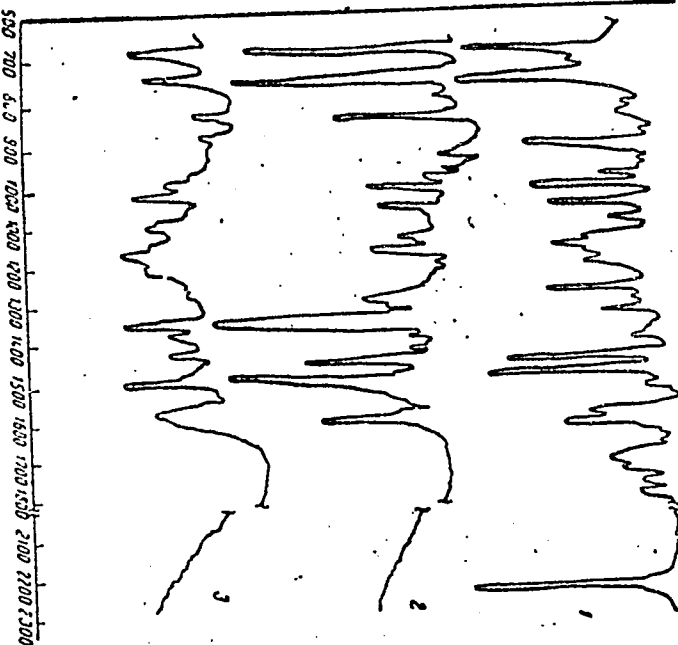
OTHER: 006

Card 2/3

ACCESSION NR: AT4034000

ENCLOSURE: 01

Fig. 1. Infrared spectra of benzonitrile monomer (1), trimer (2) and polymer (3); ordinate = transmission.



Card 3/3

ACCESSION NR: AT4034005

S/0000/63/000/000/0186/0191

AUTHOR: Zubov, V. P.; Zakharenko, Ya. T.; Kabanov, V. A.; Kargin, V. A.

TITLE: Aliphatic nitrile polymerization

SOURCE: Geterotsepny*ye vy*sokomolekulyarny*ye soyedineniya (Heterochain macromolecular compounds); sbornik statey. -Moscow, Izd-vo "Nauka," 1963, 186-191

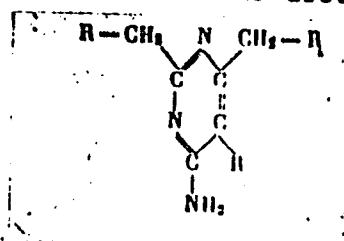
TOPIC TAGS: organic semiconductor, semiconducting polymer, polynitrile, electrical polyacetonitrile, propionitrile

ABSTRACT: Semiconducting polymers have been prepared by the polymerization of propionitrile and capronitrile as complexes with $ZnCl_2$ and $ZnCl_2$ or $TiCl_4$, respectively. The purpose of this research was to obtain fusible and processable conjugated polymers which would retain the electrical properties of such polynitriles as polyacetonitrile and polybenzonitrile. The complexes were prepared by mixing stoichiometric amounts of specially purified monomer and metal chloride in the absence of atmospheric moisture. The solid complex

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ACCESSION NR: AT4034005

was placed in ampuls which were then evacuated to high vacuum, sealed, and heated to 150—300C. Depending upon the reaction conditions, high- and low-molecular-weight products were obtained. On the basis of IR and UV spectra, the following structure was assigned to the low-molecular-weight product, which was assumed to be a trimer:



The trimer is probably an intermediate in the reaction which proceeds through the formation of macromolecules having a linear system of conjugated C=N bonds. It was found that in contrast to polyacetonitrile, the presence in the conjugated backbone of polypropionitrile and polycapronitrile of long aliphatic pendant groups, results in the formation of readily moldable and even fusible products which retain

Card 2/3

ACCESSION NR: AT4034005

sufficiently high electrical conductivity. Determination of electrical conductivity was carried out for pellet samples at different temperatures in air or in vacuum. A pronounced compensation effect was observed, i.e., the preexponential factor rose with the activation energy. The electrical conductivity at 20C ranged from 8.13×10^{-12} to $1.5 \times 10^{-7} \text{ ohm}^{-1} \text{ cm}^{-1}$. Hence the combination of relatively high electrical conductivity and the presence of the compensation effect was observed for conjugated polymers containing nitrogen hetero atoms in the backbone with hydrocarbon pendant groups. The cause of this phenomenon requires additional investigation. Orig. art. has: 3 tables, 3 figures, and 3 formulas.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University)

SUBMITTED: 23Nov62

DATE ACQ: 30Apr64

ENCL: 00

SUB CODE: CH,PH

NO REF SOV: 005

OTHER: 003

Card 3/3

ACCESSION NR: AT4020711

S/0000/63/000/000/0219/0223

AUTHOR: Kargin, V. A.; Tsarevskaya, I. Yu.

TITLE: Mechanical properties of polybutylene

SOURCE: Karbotsepnyye vyssokomolekulyarnyye soyedineniya (Carbon-chain macromolecular compounds); sbornik statey. Moscow, Izd-vo AN SSSR, 1963, 219-223

TOPIC TAGS: polybutylene, optical property, x-ray diffraction, thermomechanics, dynamometry, polyolefin, crystalline polyolefin, turbidimetry, vitrification

ABSTRACT: Two polymer modifications were obtained by the fractionation (rapid cooling) of benzene solutions of polybutylene originally prepared using $TiCl_4$ + $Al(isobutyl)_3$ as a catalyst. It was shown by optical, x-ray, thermomechanical and dynamometric investigations of these polybutylene fractions that fraction I is a typical crystalline polyolefin with a vitrification temperature of $-35^\circ C$ and a melting point of $100^\circ C$, while fraction II, under the usual conditions of the crystalline state, shows elastomeric properties under the influence of mechanical stress. This phenomenon can be explained by the rapid destruction and re-formation of the crystalline structure. The turbidimetric titration curve for unfractionated polybutylene is also given. This polymer can be looked upon as a reinforced plastic material, in which the elasticity is furnished by fraction II

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ACCESSION NR: AT4020711

and the strength by fraction I. This combination of properties is of great interest for producing highly elastic crystalline plastics. Orig. art. has: 10 figures.

ASSOCIATION: Institut neftekhimicheskogo sinteza AN SSSR (Institute of Petrochemical Synthesis, AN SSSR)

SUBMITTED: 04Jul62

DATE ACQ: 20Mar64

ENCL: 00

SUB CODE: OC, MT

NO REF SOV: 003

OTHER: 001

Card 2/2

KOVALEVA, V.P.; TOPCHIEV, D.A.; KABANOV, V.A.; KARGIN, V.A.

Polymerization of pyridine. Izv.AN SSSR.Otd.khim.nauk no.2:387
F '63. (MIRA 16:4)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova.
(Pyridine) (Polymerization)

KARGIN, V.

AID Nr. 975-2 23 May

DEVELOPMENTS AND PROSPECTS IN CHEMISTRY (USSR)

Kargin, V. Nauka i tekhnika, no. 3, Mar 1963, 6. S/259/63/000/003/001/001

Academician Kargin reviews the achievements and aims of chemistry in the USSR, stressing the importance of the chemistry of macromolecular compounds. Among the achievements in this field he mentions the development of polyformaldehyde and of a number of valuable synthetic materials with conjugated bonds. Problems to be solved include 1) development of new types of materials such as strong and elastic materials which will maintain their properties at very high and very low temperatures, of semiconductor polymers, of ion-exchange resins with very high selectivity, and of physiologically active polymers; and 2) development of new processing methods for polymers making it possible simultaneously to shape articles and to impart to the shaped polymers the desired structures.

[BAO]

Card 1/1

S/138/63/000/003/007/008
A051/A126

AUTHORS: Reztsova, Ye. V., Slonimskiy, G. L., Kargin, V. A.

TITLE: Mechano-chemical phenomena in natural rubber (NR) processing

PERIODICAL: Kauchuk i rezina, no. 3, 1963, 27 - 30

TEXT: A study was made to determine the individual effects of mechanical and chemical phenomena on the properties of an NR-base multi-component system with rubber mix ingredients during the mixing process. The effect of process duration and medium (oxygen, nitrogen, argon) on the properties was investigated. The processing effect was recorded by the number of cycles. The properties of non-vulcanized film after processing under various conditions were studied as to tensility, elasticity and swelling; creep and recovery curves were plotted and the thermomechanical method of investigation was applied. The Polany dynamometer or a stress machine was used to determine the tensile and elastic properties. The latter are found to change sharply during processing. Experimental data proved that the mixing of rubber mixes is a mechano-chemical process. Submitted information proved the necessity for taking into consideration the change in

Card 1/2

Mechano-chemical phenomena in natural...

S/138/63/000/003/007/008
A051/A126

properties of the raw mix during processing and the possibility of regulating these changes by creating a rational technological process of raw mix preparation. The processing of the systems in an inert medium (nitrogen, argon) and the sharp reduction of the rolling duration ensures a substantial modification of the rubber by chemical reagents and the production of systems with high tensile properties. There are 4 figures.

ASSOCIATION: Nauchno-issledovatel'skiy institut shinnoy promyshlennosti
(Scientific Research Institute of the Tire Industry)

Card 2/2

L 17479-63

EWI(j)/EMI(m)/BDS ASD PC-4 RM

ACCESSION NR: AP3004761

S/0183/63/000/004/0032/0033

AUTHORS: Berestnev, V. A.; Dubova, L. S.; Kargin, V. A.

TITLE: Quantitative evaluation of several parameters of macromolecular structure of viscose fibers

SOURCE: Khimicheskiye volokna, no. 4, 1963, 32-33

TOPIC TAGS: nephelometry, viscose fiber, triethylbenzylammonium

ABSTRACT: The quantity, concentration and relative position of the reinforcing macroformation of viscose fibers which determines their mechanical properties must be determined to evaluate the characteristic structure of self-reinforcing fibers. Concentration was determined nephelometrically by dissolving the fibers in aqueous triethylbenzylammonium hydroxide (TERA), which dissolves only the binding particles which are less solvent-resistant than the reinforcing particles. Comparison of the optical density of the TERA solution and the fiber strength was not monotonic since strength depends on more than number of reinforcing particles. However, the fibers that stretched the most did give the highest density. "We express thanks to M. B. Ly*tkinoy (NIISHP) for supplying samples."

Cord 1/2

L 17479-63

ACCESSION NR: AP3004761

Orig. art. has: 2 figures and 1 table.

ASSOCIATION: NII shinnoy promyashlennosti (NII for the Tire Industry); NIFKhI im.
L. Ya. Karpova (NIFKhI)

SUBMITTED: 27Sep62

DATE ACQ: 20Aug63

ENCL: 00

SUB CODE: MA

NO REF SOV: 003

OTHER: 000

Card 2/2

F. ANDIYEV, A.A.; CHERNEVA, Ye.P.; TUNITSKIY, N.M.; KARGIN, V.A.

Preparation of complex-forming polymeric materials as homogeneous films, and the study of their properties. Azerb. khim. zhur. no.5:73-78 '63 (MIRA 17:8)

BERESTNEV, V.A.; LYTKINA, M.B.; KARGIN, V.A.

Change of the structure of fibers of viscose cord during warming up.
Khim.volok no. 6:47-51 '63. (MIRA 17:1)

1. Nauchno-issledovatel'skiy institut shinnoy promyshlennosti (for Berestnev, Lytkina). 2. Fiziko-khimicheskiy institut im. Karpova (for Kargin).

S/190/63/005/004/012/020
B101/B220

AUTHORS: Razikov, K. Kh., Markova, G. S., Kargin, V. A.

TITLE: Supermolecular formations in oriented polycapramide. I.
Effect of fiber orientation and of subsequent thermal treatment on the morphology of the crystalline structure of polycapramide

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 5, no. 4, 1963, 552-557

TEXT: Ultra-thin sections of stretched and nonstretched polycapramide fibers were examined in the electron microscope without and after thermal treatment at 205°C. Results: (1) Nonoriented fibers showed an inhomogeneous structure of macrofibrils and transparent amorphous regions. (2) Stretching orientation develops supermolecular formations which are oriented along the macrofibrils. (3) Thermal treatment leads to the formation of large complex supermolecular formations, such as bundles and spherulites, sometimes even to the formation of laminated crystals. The supermolecular formations developing inside the macrofibrils are not oriented, even in stretched fibers. There are 2 figures.

~~Card 1/2~~

Physico-Tech Inst. in L. Ya. Karpov

S/190/63/005/004/015/020
B101/B220

AUTHORS: Slovokhotova, N. A., Koritskiy, A. T., ~~Kargin, V. A.~~,
Buben, N. Ya., Bibikov, V. V., Il'icheva, Z. F.,
Rudnaya, G. V.

TITLE: Effect of fast electrons on polyethylene at low temperatures.
I. Double bonds in irradiated polyethylene

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 5, no. 4, 1963, 568-574

TEXT: High-density polyethylene (PE), low-density PE, and PE obtained by radiation polymerization, were irradiated with 1.6 Mev electrons in liquid or gaseous N_2 . The dose was varied from 25 to 300 Mrad. The IR spectra were studied from -196 to $+50^\circ C$. The intensity of the 966 cm^{-1} band proved to be independent of the nature of the PE and of the temperature. Hence it is concluded that the trans-vinylene bonds form in the primary irradiation act. On the contrary, the 909 cm^{-1} band characteristic of vinyl bonds was with 200 Mrad and at $-196^\circ C$ six times as large and at $-50^\circ C$ only 2.5 times as large as in nonirradiated PE. With doses below 25 Mrad the initial concentration of vinyl groups decreased, whereas with

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higher doses it increased. Thus irradiation induces the formation as well as the disappearance of vinyl double bonds, the disappearance being favored by higher temperatures. From the experimental fact that the N_{tv}/N_v ratio of the trans-vinylene to the vinyl groups is 18 for PE obtained by radiation polymerization, but 14 with high-density PE, it is assumed that the most probable process is a migration of energy and the formation of vinyl groups by the H atoms splitting off from two neighboring C atoms at the end of the molecular chain. There are 3 figures and 1 table.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physico-Chemical Institute imeni L. Ya. Karpov)

SUBMITTED: October 11, 1961

Card 2/2

S/190/63/005/004/016/020
B101/B220

AUTHORS: Slovkhotova, N. A., Koritskiy, A. T., Kargin, V. A.,
Buben, N. Ya., Il'icheva, Z. F.

TITLE: Effect of fast electrons on polyethylene at low temperatures.
II. Conjugated double bonds and allyl radicals in irradiated
polyethylene

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 5, no. 4, 1963, 575-580

TEXT: The IR and epr spectra of irradiated polyethylene were studied.
Results: (1) Irradiation with more than 50 Mrad induces the formation of
conjugated double bonds which are characterized by the 985 cm^{-1} band.
(2) At low temperatures allyl groups form which are characterized by the
 944 cm^{-1} band detected also in the epr spectrum. (3) When benzene or
toluene were admixed to the polyethylene the yield in allyl radicals and
conjugated bonds was reduced. A protective action of the benzene ring
owing to charge migration is assumed. There are 4 figures.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physico-
chemical Institute imeni L. Ya. Karpov)
~~Card 1/2-~~

S/190/63/005/004/017/020
B101/B220

AUTHORS: Berestnev, V. A., Kargin, V. A.

TITLE: Self-reinforcing effect in fibers

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 5, no. 4, 1963, 581-586

TEXT: Ultra-thin sections of fibers of hydrated cellulosis, polycapramide, polyene anthamide and polyethylene terephthalate were examined with the electron microscope. It was found that these fibers contained anisodiametrical macroformations which are oriented predominantly in the axis of the macrofibrils and consist of macromolecular bundles. These formations act self-reinforcing, since they consist of the same substance as the non-oriented surrounding medium. On deformation, the macroformations migrate inside the macrofibrils. To produce cord of ultra-high strength the aim should be to synthesize reinforced or self-reinforcing fibers. There are 8 figures.

~~Card 1/2~~

L 13557-63

EWf(j)/EET(a)/BDS/ES(y)

AFFTC/ASD

Pc-4/Pe-4

RM

ACCESSION NR: AP3000704

8/0190/63/005/005/0760/0766

AUTHOR: Razikov, K. Kh.; Zubov, Yu. A.; Markova, G. S.; Kargin, V. A.

TITLE: Supramolecular formations in oriented polycapramide. 2. Effect of thermal treatment on the crystalline structure of polycapramide monofibers

SOURCE: Vyssokomolekulyarnyye soyedineniya, v. 5, no. 5, 1963, 760-766

TOPIC TAGS: supramolecular formations, oriented polycapramides, monofibers, the large period, orientation

ABSTRACT: Monofibers of unstretched and five-fold stretched polycapramide were annealed at 205C for 1.5, 3, and 6 hours, and ultrathin longitudinal slices of these were studied by electron microscope and x-rays. The formation of large supramolecular bodies of spherolytic, microfibrillar, and laminated structure was observed on the monofibers, the stretched fibers yielding structurally more perfect formations. The dimensions of the microfilament unit, constituting the basic unit of the structurally oriented monofibers, were estimated as 100 Angstrom in width and a few microns in length. Low-angle x-ray investigations disclosed the presence in both the stretched and the unstretched unheated polycapramide monofibers of large period units ($d = 83$ Angstrom), which in the stretched fibers were oriented along their axis. Annealing causes the large period units to increase to $d = 96$ Angstrom,

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ACCESSION NR: AP3000704

suggesting a pleated chain structure in the unheated monofibers. Orig. art. has:
9 figures.

ASSOCIATION: Fiziko-khimicheskiy institut imeni L. Ya. Karpova (Physicochemical
Institute)

SUBMITTED: 23Nov61

DATE ACQ: 17Jan63

ENCL: 00

SUB CODE: CH

NO REF SOV: 007

OTHER: 004

Card 2/2

L 12436-63

EWP(j)/EPT(c)/EWT(m)/BDS ASD Pc-h/Pr-h RM/WW

ACCESSION NR: AP3001156

S/0190/63/005/006/0846/0849

AUTHOR: Kocheshkov, K. A.; Kargin, V. A.; Sheverdina, N. I.; Sogolova, T. I.;
Paleyeva, I. Ye.; Paleyev, O. A.

TITLE: Polymers of ethylene prepared by means of organocadmium-titanium tetra-
chloride mixtures

SOURCE: Vy*sokomolekulyarny*ye soyedineniya, v. 5, no. 6, 1963, 846-849

TOPIC TAGS: polymers, ethylene, organocadmium compounds, titanium tetrachloride,
polyethylene, dioxanates

ABSTRACT: The polymerization of ethylene was conducted in a reactor filled with
ethylene gas to which were added 300 ml of hexane and from 0.025 to 0.007 Mol/liter
of an organic cadmium compound, cooled to -30C, and followed by dropwise addition,
under constant stirring, of a titanium tetrachloride solution in hexane, in a ratio
C-Me/ TiCl₄ = 1/1. The highest yields were obtained with (n-C₄H₉)
sub 2 Cd and (p-CH₃C₆H₄)₂ Cd, and it was observed that com-
plexes of the cadmium compounds with dioxane were equally effective. In comparing
the polymerization processes conducted with diphenylcadmium and phenylcadmiumiodide
it was found that the yield of an essentially similar polyethylene amounted in the

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L 12436-63

ACCESSION NR: AP3001156

latter case to only one-half of the one obtained with diphenylcadmium, thus revealing the equivalency of the same radicals in the organometallic component in the catalyst and the essential role played by their number. The obtained polyethylenes were essentially white powders. Thermomechanical studies were conducted on films obtained at 180-185C and 90-100 atm, which were stretched in one direction. It was found that the polymers possessed sufficiently high values of recrystallization stress and tensile strength and high stretch and softening point values, the latter in the 130-135C range. Orig. art. has: 2 tables.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physico-Chemical Institute)

SUBMITTED: 25Nov61

DATE ACQ.: 01Jul63

ENCL: 00

SUB CODE: 00

NO REF SOV: 006

OTHER: 005

Card 2/2

L 11286-63 EWP(j)/EWT(m)/BDS--AFETC/ASD--Pc-4--RM/MAY
ACCESSION NR: AP3001167 S/0190/63/005/006/0921/0924
AUTHOR: Kargin, V. A.; Sogolova, T. I.; Shaposhnikova, T. K. 62
61
TITLE: Effect of fillers with particles of irregular shape on the properties of polymers. II.
SOURCE: Vysokomolekulyarnyye soyedineniya, v. 5, no. 6, 1963, 921-924
TOPIC TAGS: reinforcement, filler, polyvinyl alcohol, glycerin, V_2O_5 sol, sol lifetime, filler particle shape, asymmetrical secondary structure
ABSTRACT: The reinforcement of polymers with fillers composed of particles of irregular shape and a thickness commensurate with bundles of the polymer molecules has been studied. Experiments were conducted with films prepared from polyvinyl alcohol (PVA), plasticized with glycerin, and an aqueous dispersion of V_2O_5 . Freshly prepared V_2O_5 sols are amorphous, with particles of irregular shape. The sols become crystalline after a time, and needlelike particles 10 to 20 Å thick, with length increasing with time, are formed. Their length can be controlled by changing the lifetime of the sol. The growth of the particles practically ceases in the viscous polymer medium. Experiments conducted with PVA plasticized with 28% glycerin (tensile strength, 200 kg/cm²) showed that the strength of the
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L 11286-63

ACCESSION NR: AP3001167

specimens increases by about 50 to 100% with an increase in sol concentration of up to 10% and, to a certain extent, with an increase in the particle length. A highly reinforcing effect is produced only by particles of irregular shape; the effect of crystalline V_2O_5 is very slight. It was shown by analysis of PVA plasticized with 45 to 50% glycerin (tensile strength, 90 kg/cm²) that the reinforcing effect of the filler is higher in polymers with a lower strength. Microscopic studies revealed that after 72 hr pure V_2O_5 sols develop asymmetrical secondary structures similar to those of polymers and that these structures remain in the presence of PVA. The increase in the reinforcing effect of V_2O_5 sols with an increase in sol lifetime can be ascribed not only to the presence of irregular particles, but also, to a certain extent, to their aggregation into asymmetrical secondary formations. Orig. art. has: 2 figures.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physicochemical Institute)

SUBMITTED: 26Dec61

DATE ACQ: 01Jul63

ENCL: 00

SUB CODE: CH

NO REF SOV: 005

OTHER: 000

1s/10
Card 2/2

L 12429-63 EPR/EWP(j)/EPF(c)/EWT(m)/BDS ASD Pc-4/Ps-4/Pr-4 RM/WW
 ACCESSION NR: AP3001169 S/0190/63/005/006/0932/0937

AUTHOR: Shibayev, V. P.; Plate, N. A.; Zezina, L. A.; Kargin, V. A.

TITLE: The processes of structure formation in a graft copolymer on the basis of a crystallizing polyester 74
 72

SOURCE: Vy*sokomolekulyarny*ye soyedineniya, v. 5, no. 6, 1963, 932-937

TOPIC TAGS: lattice formation, graft copolymer, polyester, polyhydroxypelargonate, macromolecules, polymethacrylic acid

ABSTRACT: In earlier publications the authors investigated copolymeric systems where the basic chain consisted of a crystallizing homopolymer, while the side grafts were of the noncrystallizing type. They demonstrated that the crystallization of the homopolymer was prevented, having stopped at the fibrillar type stage. The purpose of the present investigation was to find out whether in a copolymeric system consisting of a crystallizing and an amorphous polymeric components, grafted in the reverse order, a similar inhibitory effect would take place. In this case methacrylic acid/polymer formed the basic chain, while crystalline polyoxypelargonate constituted the grafted side chains. Macromolecules of polyoxypelargonate were treated with methacrylchloride, and the resulting unsaturated

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L 12429-63

ACCESSION NR: AP3001169

2
polyester was subjected to a polymerization reaction with methacrylic acid, yielding the desired copolymer of 1:1 ratio. The latter was studied by electron microscope and x-rays, following annealing at 60-130C and was found to be amorphous. When, however, the annealing temperature was raised to 145-150C, there appeared in the side chains of the copolymer fibrillar structures with filaments of 100 Angstrom in diameter. Thus, the existence of a chemical bond between the two polymers seems to interfere with the crystallization of polyhydroxypelargonate. Thanks are given to G. S. Kolesnikov for supplying the graft copolymers. Orig. art. has: 3 figures and 3 formulas.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University)

SUBMITTED: 06Jan62

DATE ACQ: : 01Jul63

ENCL: 00

SUB CODE: 00

NO REF SOV: 010

OTHER: 000

Card 2/2

L 33334-63
 PC-4/Pr-4 RM/WW/EW/MAY/JWD/H
 ACCESSION NR: AP3003781
 EPR/ENP(3)/EPF(6)/EWT(m)/BDS
 AFFIC/ASD/RPL Ps-4/
 S/0190/63/005/007/0953/0959

AUTHOR: Leshchenko, S. S.; Karpov, V. L.; Kargin, V. A.

TITLE: Electron-diffraction study of fluorine-containing polymers

SOURCE: Vy*ekonomolekulyarny*ye soyedineniya, v. 5, no. 7, 1963, 953-959

TOPIC TAGS: fluorine-containing polymer, fluorine-containing copolymer, electron diffraction, crystalline copolymer, amorphous copolymer, copolymer film, polymer crystalline lattice, rubberlike copolymer, substituent, substituent size, substituent distribution, chlorine substituent, vinylidene fluoride, hexafluoropropylene, chlorotrifluoroethylene

ABSTRACT: The structures of copolymers of vinylidene fluoride and hexafluoropropylene (copolymers I) and of chlorotrifluoroethylene and vinylidene fluoride (copolymers II) have been studied by the electron-diffraction method. The purpose of the study was to determine the effects of the nature of the second monomer, its content, and its distribution along the chain on the crystallization capacity of the polymers. The experiments were conducted with unstretched and stretched films of copolymers I containing 7-35 mol% C_2F_6

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L 13334-63

ACCESSION NR: AP3003781

groups and of copolymers II containing 16.6—66.7 mol% $C_2F_2H_2$ groups. The results of the study, presented in the form of tables and electron diffraction patterns, show that copolymers containing up to 7% C_3F_6 groups in the vinylidene fluoride chain and up to 16% $C_2F_2H_2$ groups in the chlorotrifluoroethylene chain exhibit a crystalline structure identical with that of the respective homopolymers. An increase in the content of the second monomer in the copolymers gradually induces disorder in the crystalline lattice. Copolymers I containing over 15% C_3F_6 groups and copolymers II containing over 25% $C_2F_2H_2$ groups are amorphous and exhibit rubberlike properties. The results indicate that the amorphous character of these copolymers is due to the great difference in the size of the substituents (Cl and $-CF_3$ groups) and to an irregular distribution of substituents along the chain. It is concluded that it is possible to convert plastics into polymers with rubberlike properties by the introduction of large and irregularly distributed atoms or groups which upset the regularity of the chain. Orig. art. has: 4 figures and 3 tables.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physicochemical Institute)

SUBMITTED: 30Oct63

SUB CODE: CH

Card 2/2

DATE ACQ: 08Aug63

NO REF SOV: 003

ENCL: 00

OTHER: 003

L 14950-63

EPR/BMP(j)/EPF(c)/EWT(m)/BDS

ASD

Ps-4/Pc-4/Pr-4

RM/WW

ACCESSION NR: AP3003782

S/0190/63/005/007/0960/0965

AUTHORS: Gatovskaya, T. V.; Pavlyuchenko, G. M.; Berestnev, V. A.; Kargin, V. A. 74

TITLE: Sorption of low molecular compounds by polymers at high temperatures 72

SOURCE: Vy*sokomolekulyarny*ye soyedineniya, v. 5, no. 7, 1963, 960-965

TOPIC TAGS: sorption, polymer, polyolefin

ABSTRACT: An improved apparatus was constructed to determine the sorption of n-dodecane by polyethylene at 75-200C and of n-octane by polybutylene at 25-115C. The apparatus was entirely glass-sealed and permitted the recording of temperature, pressure, and weight of the polyolefin samples. Isotherms of sorption at various temperatures were charted, and it was found that the sorption capacity of polyethylene increases with temperature, reaching a maximum at 130C, the melting point for this crystalline polymer. In polybutylene, on the other hand, the sorption capacity decreases from 250 to 60C. From there on it rises up to its melting point. The conclusions drawn from the obtained results point to a higher flexibility in the polybutylene macromolecules as compared with polyethylene, which may be due to a shorter carbon chain and a greater branching out of polybutylene. Orig. art. has: 4 charts.

ASSOCIATION: Physico-Chemical Institute

Card 1/2/

L 15606-63 EWP(j)/EWT(m)/BDS/ES(v) AFFTC/ASD Pc-4/Pg-4 RM
ACCESSION NR: AP3004702 S/0190/63/005/008/1156/1159

AUTHORS: Berestnev, V. A.; Razikov, K. Kh.; Kargin, V. A. 64
63

TITLE: Supermolecular structure of caprone fibers 15

SOURCE: Vyssokomolekulyarnyye soyedineniya, v. 5, no. 8, 1963, 1156-1159

TOPIC TAGS: caprone fibers, supermolecular structure, macrofibrils, polymorphism

ABSTRACT: The materials under study were 20 μ thick caprone filaments which were stretched at room temperature to 4.5-5 times their original length. Ultrathin slices of these were obtained by means of an ultramicrotome and subjected to electron microscope studies under direct 30 000 magnification. A longitudinal section of a macrofibril reveals a string of large globular structures forming the axis of the filament, with a layer of small globules forming a coat around it. Beside these there coexist irregular globular structures of mixed spherulites and clusters of needle-like elements presumably derived from the breakup of spherulites. These structures are embedded in a homogeneous optically translucent medium, probably consisting of orderly supermolecular formations. The existence of a relief in some of the slices suggests that the ultramicrotome has a shearing

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L 15606-63

ACCESSION NR: AP3004702

effect on the filaments rather than a cutting one. The authors stress the polymorphic nature of the supermolecular structure of caprone fibers. Orig. art. has: 6 pictures.

ASSOCIATION: Nauchno-issledovatel'skiy institut shinnoy promy*shlennosti, Fiziko-khimicheskiy institut im. L. Ya. Karpova (Scientific Research Institute of the Tire Industry, Physical-Chemical Institute)

SUBMITTED: 25Dec61

DATE ACQ: 28Aug63

ENCL: 00

SUB CODE: CH

NO REF SOV: 012

OTHER: 004

Card 2/2

ZUBOV, Yu.A.; MARKOVA, G.S.; KARGIN, V.A.

X-ray diffraction examination of polyethylene, polycapramide,
and polyethylene terephthalate fibers. Vysokom.sosd. 5 no.8:
1171-1177 Ag '63. (MIRA 16:9)

1. Fiziko-khimicheskiy institut imeni L.Ya.Karpova.
(Textile fibers, Synthetic) (X-ray diffraction examination)

KONSTANTINOPOL'SKAYA, M.B.; BERESTNEVA, Z.Ya.; KARGIN, V.A.

Effect of the molecular weight on the cross-linking of low pressure
polyethylene. Part 4. Vysokom.soed. 5 no.11:1702-1705 N '63.
(MIRA 17:1)

1. Fiziko-khimicheskiy institut imeni L.Ya.Karpova.

KARGIN, V.A.; KORETSKAYA, T.A.

Electron microscope study of the effect of oleic acid on the
development of secondary structures in polyethylene. Vysokom.
soed. 5 no.11:1729-1733 N '63. (MIRA 17:1)

1. Fiziko-khimicheskiy institut imeni Karpova.

ACCESSION NR: AP4007979

S/0190/63/005/012/1809/1816

AUTHORS: Kargin, V. A.; Sogolova, T. I.; Talipov, G. Sh.

TITLE: Supermolecular structure of plasticized and nonplasticized crystalline polystyrene

SOURCE: Vy*sokomolekulyarny*ye soyedineniya, v. 5, no. 12, 1963, 1809-1816

TOPIC TAGS: polymer, polystyrene crystalline, polystyrene, plasticized crystalline polystyrene, plasticization, plasticizer, secondary structure, globule, spherulite, bundle, rod, supermolecule structure formation, plasticized polystyrene mechanical property, polymer mechanical property, phthalic acid dimethyl ester, cetyl chloride, supermolecular structure

ABSTRACT: The supermolecular structure of plasticized (dimethyl-phthalate and cetyl chloride plasticizer) and nonplasticized crystalline polystyrene has been studied in temperature intervals from 110-215C and at crystallization durations of 10 to 150 minutes. The structure-forming process was observed under a polarizing microscope MIN-8 with a 200-600 magnification. A new type of structuralization was discovered, in which spherulites serve as initial structure units, commensurable

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ACCESSION NR: AP4007979

in dimension with the colloidal particle size. It was found that the plasticizer has a substantial effect on the nature and dimensions of crystalline polymer secondary structure, and a definite correlation was established between plasticized polymer macrostructure and its mechanical properties. Orig. art. has: 16 micro-photographs and 1 chart.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physicochemical Institute)

SUBMITTED: 24Apr62

DATE ACQ: 20Jan64

ENCL: 00

SUB CODE: MA

NO REF SOV: 004

OTHER: 001

Card 2/2

ARZHAKOV, S.A.; SLONIMSKIY, G.L.; SHTARKMAN, B.P.; KARGIN, V.A.

Temperature and pressure dependence of the specific volume
of polymers. Part 1: Polymethyl methacrylate. Vysokom. soed.
5 no.12:1854-1860 D '63. (MIRA 17:1)

KAPRALOVA, Z.A.; MIRLINA, S.Ya.; KOZLOV, P.V.; KARGIN, V.A.;
KALYUZHNAIA, R.I.

Structure formation and enzymatic activity of pepsin and
trypsin fragments in the course of autolysis and electro-
dialysis. Vysokom. soed. 5 no.12:1870-1874 D '63.

(MIRA 17:1)

1, Moskovskiy gosudarstvennyy universitet im. Lomonosova.

SOGOLOVA, T.I.; SLONIMSKIY, G.L.; KARGIN, V.A.

Viscoplastic flow and flow temperature of polymers. Vysokom.
soed. 5 no.12:1875-1878 D '63. (MIRA 17:1)

1. Fiziko-khimicheskiy institut im. Karpova i Institut
elementoorganicheskikh soyedineniy AN SSSR.

KARGIN, V. [Karhin, V.], akademik

Synthesis means creation. Nauka i zhyttia 12 no.3:4-5 Mr '63.
(MIRA 16:11)

AID Nr. 976-14 24 May

KARGIN V.A.
FORMATION OF SECONDARY STRUCTURES IN POLYETHYLENE (USSR)

Konstantinopol'skaya, M. B., Z. Ya. Berestneva, and V. A. Kargin.
Kolloidnyy zhurnal, v. 25, no. 2, Mar-Apr 1963, 174-177.

S /069/63/025/002/004/010

The influence of temperature, type of solvent, and solution concentration on the structures formed in low-pressure polyethylene (PE) has been studied by the electron microscope method at the Physicochemical Scientific Research Institute imeni L. Ya. Karpov. The experiments were conducted with PE of an average mol. wt. of 190,000 to 1,000,000 (in this range mol. wt. does not affect structure). The results of the study are given in the form of electron micrographs. The influence of temperature on structure was studied by depositing a PE film from a boiling 0.01% solution of PE in xylene onto a calloxylin substrate heated to 20 to 120°C. It was shown that 1) at 20 to 70°C such complex secondary structures as planes, spirals, and crystals are

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AID Nr. 976-14 24 May

FORMATION OF SECONDARY STRUCTURES [Cont'd]

S/069/63/025/002/004/010

formed; 2) above 100°C mainly simple secondary structures (bundles and ribbons) are observed; and 3) the greatest variety of structures is formed at 90°C. Experiments conducted with decalin and tetralin solutions of PE yielded similar results; at 90°C α -chloronaphthalene solutions of PE yielded only complex secondary structures, owing to the slower evaporation of the solvent. The character of the structures formed was shown to be almost independent of the concentration of the solution in the 0.001 to 0.1% concentration range. The formation of structures proceeded very rapidly (in a matter of seconds). It is believed that the solutions contain, in addition to dissolved molecules, bundles which are the main structural units of the secondary structures. Thus, in the process of structure formation in solution the character of secondary structures must depend on such factors as solution cooling rate and solvent evaporation rate, which favor or impede the development of complex structures.

[BAO]

Card 2/2